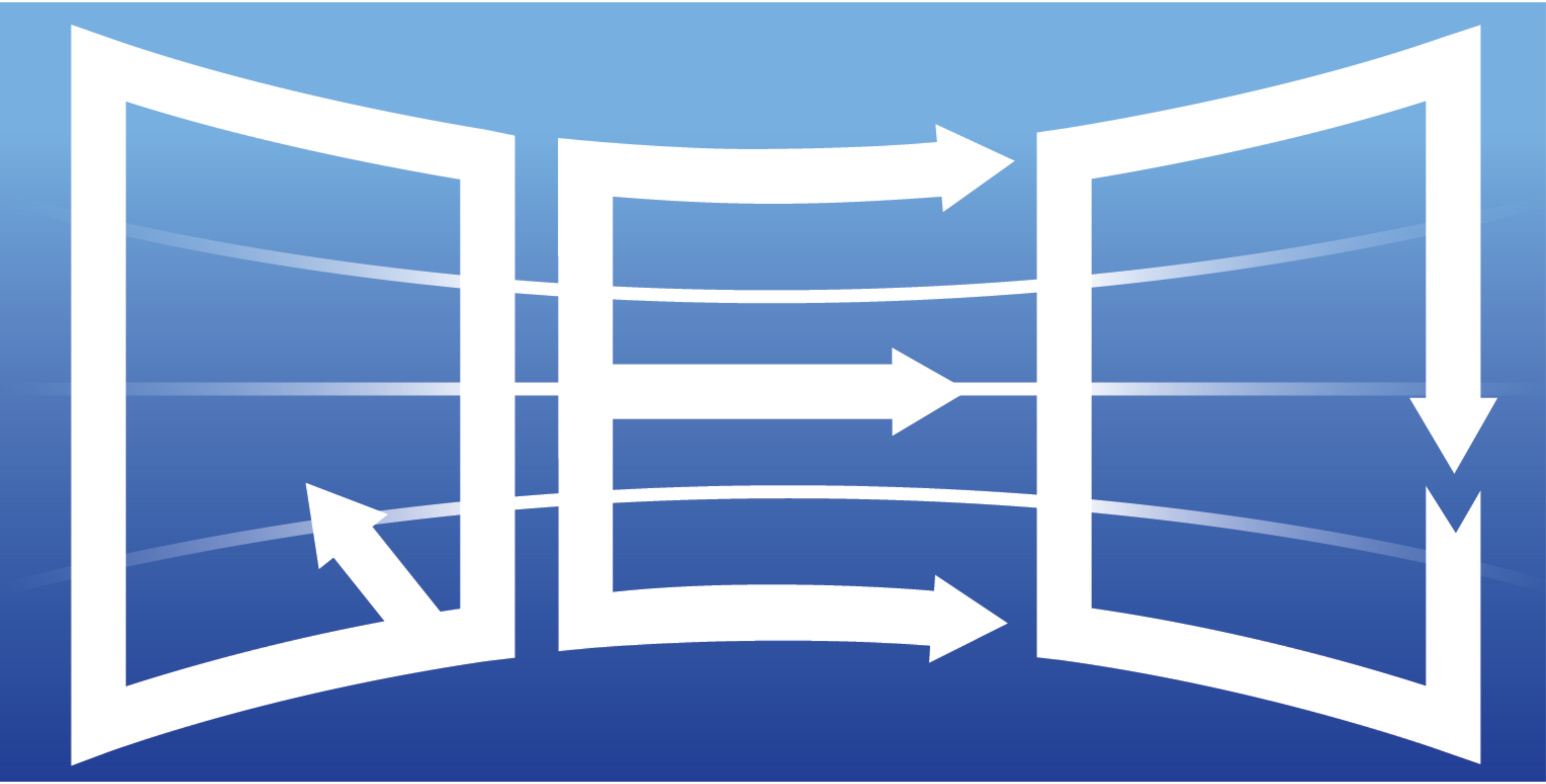


OFFICE OF THE DIRECTOR OF NATIONAL INTELLIGENCE

Quantum Enhanced Optimization (QEO) Program Proposers' Day

Karl F. Roenigk, PM
Office of Safe and Secure Operations

26 October 2015

QEO Proposers' Day Agenda

Monday, October 26, 2015		
7:30 AM – 8:00 AM	**Registration**	
8:00 AM – 8:05 AM	Welcome and opening remarks	Karl F. Roenigk Program Manager
8:05 AM – 8:30 AM	IARPA Overview	Jason Matheny Director, IARPA
8:30 AM – 9:30 AM	QEO Program Overview	Karl F. Roenigk Program Manager
9:30 AM – 09:50 AM	**Break**	
09:50 AM – 10:20 AM	Doing Business with IARPA	Tarek Abboushi IARPA Acquisitions
10:20 AM – 12:20 PM	The 2014-2015 IARPA QEO Study: Accomplishments and Implications	Jamie Kerman & Will Oliver, MIT LL; Matthias Troyer, ETH Zurich
12:20 PM – 1:30 PM	**Lunch and Poster Session**	

QEO Proposers' Day Agenda

Monday, October 26, 2015		
1:30 PM – 2:30 PM	QEO Program Feedback and Q&A	Karl Roenigk, Jamie Kerman, Will Oliver, & Matthias Troyer
2:30 PM – 6:00 PM	**Offerors' Capabilities Briefings and Posters**	**Attendees (No Government)**
2:30 PM – 3:30 PM	Potential Proposers 5-Minute Presentations	Attendees (No Government)
3:30 PM – 4:00 PM	**Break and Networking**	Attendees (No Government)
4:00 PM – 5:00 PM	Potential Proposers 5-Minute Presentations	Attendees (No Government)
5:00 PM – 6:00 PM	Poster Session and Networking	Attendees (No Government)

Proposers’ Day Goals

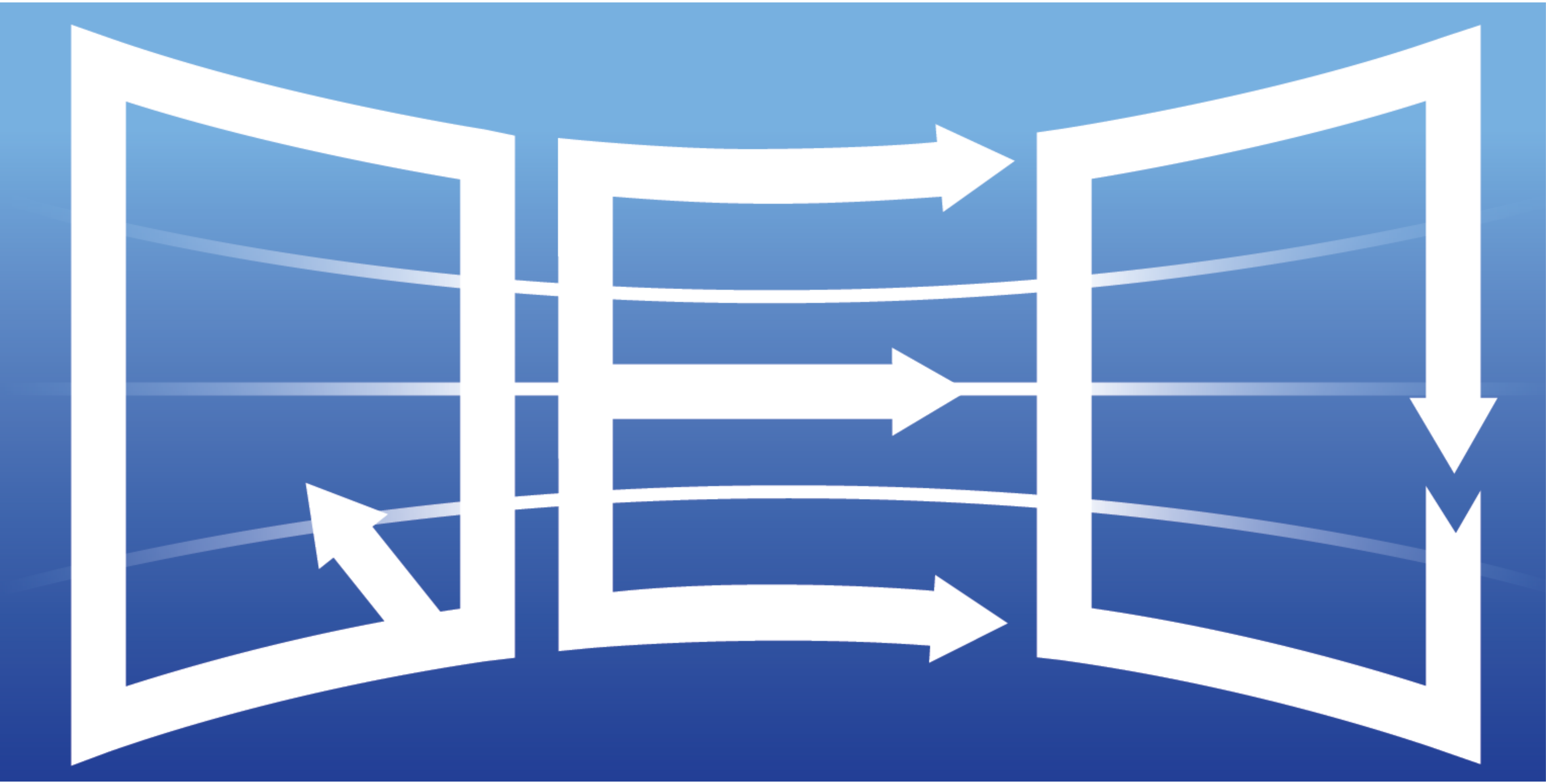
- Familiarize participants with IARPA and with the QEO program concept
- Solicit feedback and questions
- Foster networking and discussion of synergistic opportunities and capabilities among potential program participants (i.e., “teaming”)

Please ask questions and make suggestions: this is your chance to influence the design of the program

- *We appreciate and seek constructive feedback on any / all aspects of the program design and program metrics.*
- *Record your questions and comments on the note cards provided and submit them to IARPA staff during the break.*
- *After today, questions will be answered in writing on the program website*
- *Once a BAA is released, questions can only be submitted to the email address provided in the BAA*

Disclaimer

- These presentations are provided solely for information and planning purposes
- The Proposers' Day does not constitute a formal solicitation for proposals or abstracts
- Nothing said at Proposers' Day changes the requirements set forth in a BAA
  - i.e., A BAA supersedes anything presented or stated by IARPA at the Proposers' Day



OFFICE OF THE DIRECTOR OF NATIONAL INTELLIGENCE

IARPA Overview

Jason Matheny, Director IARPA

Office of the Director of National Intelligence

Central Intelligence Agency

Defense Intelligence Agency

Department of State

National Security Agency

Department of Energy

National Geospatial-Intelligence Agency

Department of the Treasury

National Reconnaissance Office

Drug Enforcement Administration

Army

Federal Bureau of Investigation

Navy

Department of Homeland Security

Air Force

Coast Guard

Marine Corps

IARPA Mission and Method

IARPA's mission is to invest in high-risk/high-payoff research to provide the U.S. with an overwhelming intelligence advantage

- **Bring the best minds to bear on our problems**
  - Full and open competition to the greatest possible extent
  - World-class, rotational Program Managers
- **Define and execute research programs that:**
  - Have goals that are clear, measureable, ambitious and credible
  - Employ independent and rigorous Test & Evaluation
  - Involve IC partners from start to finish
  - Run from three to five years
  - Publish peer-reviewed results and data, to the greatest possible extent

Analysis R&D

"Maximizing insight from the information we collect, in a timely fashion"

Large Data Volumes and Varieties

Providing powerful new sources of information from massive, noisy data that currently overwhelm analysts

Social, Cultural, and Linguistic Factors

Analyzing language and speech to produce insights into groups and organizations

Improving Analytic Processes

Dramatic enhancements to analytic process at the individual and group level

Collection R&D

"Dramatically improve the value of collected data"

Novel Access	Asset Validation and Identity Intelligence	Tracking and Locating
Reach hard targets in denied areas	Assess trustworthiness and advance biometrics in real-world conditions	Accurately locate emitters and other intelligence interests

Anticipatory Intelligence R&D

"Detecting and forecasting significant events"

S & T Intelligence	Indications & Warnings	Strategic Forecasting
Detecting and forecasting the emergence of new technical capabilities	Early warning of social and economic crises, disease outbreaks, insider threats, and cyber attacks	Probabilistic forecasts of major geopolitical trends and rare events

Operations R&D

"Operate effectively in a globally interdependent and networked environment"

Computational Power

Revolutionary advances in science and engineering to solve problems intractable with today's computers

Trustworthy Components

Gain the benefits of leading-edge hardware and software without compromising security

Safe and Secure Systems

Protecting systems against cyber threats

How to engage with IARPA

- **Website: www.IARPA.gov**
  - Reach out to us, especially the IARPA PMs. Contact information on the website.
  - Schedule a visit if you are in the DC area or invite us to visit you.

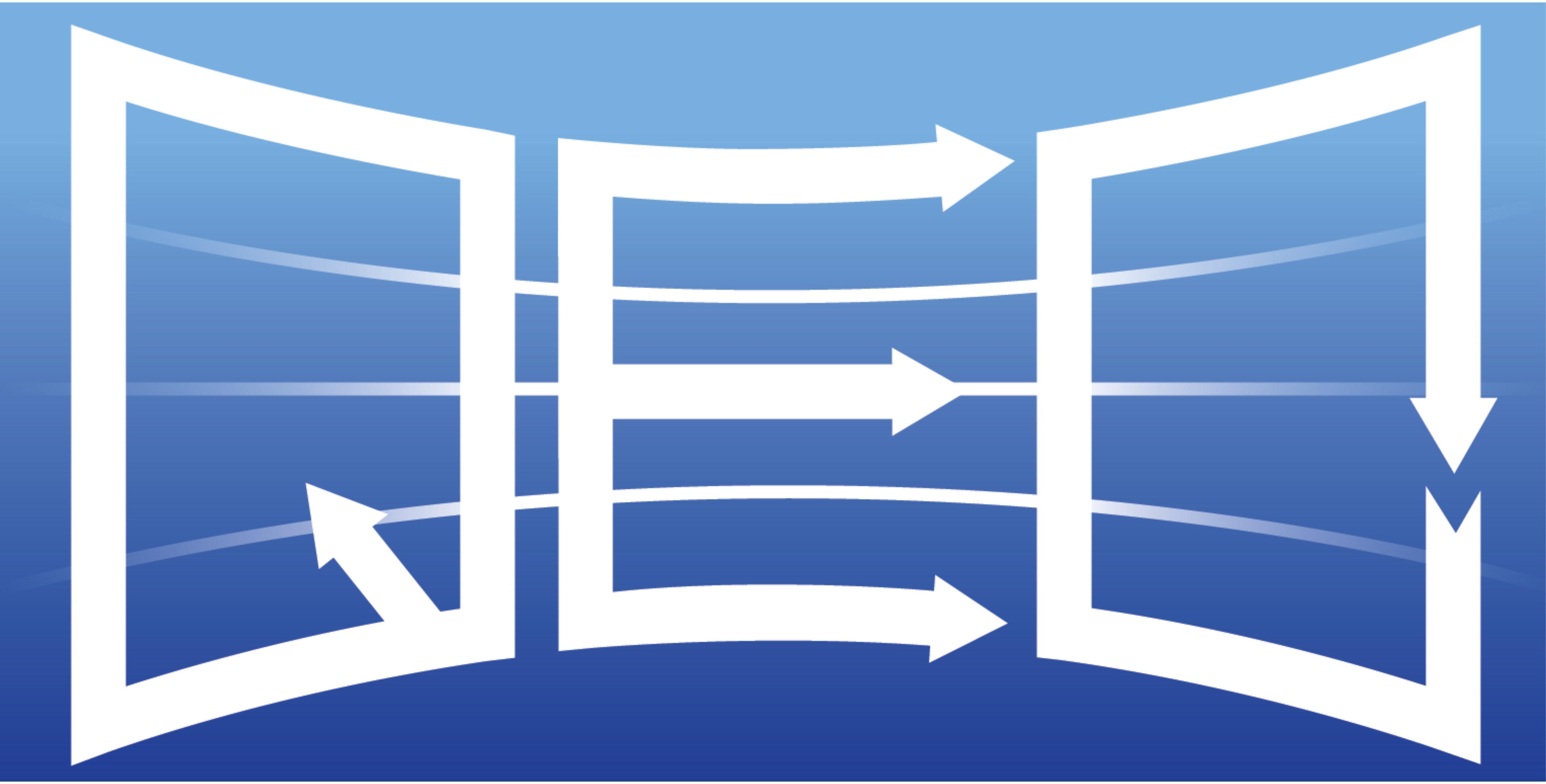
- **Opportunities to Engage**:
  - **Research Programs**
    - Multi-year research funding opportunities on specific topics
    - Proposers' Days are a great opportunity to learn what is coming, and to influence the program
  - **"Seedlings"**
    - Allow you to contact us with your research ideas at any time
    - Funding is typically 9-12 months; IARPA funds to see whether a research program is warranted
    - IARPA periodically updates the topics of interest
  - **Requests for Information (RFIs) and Workshops**
    - Often lead to new research programs, opportunities for you to provide input while IARPA is planning new programs

Concluding Thoughts

- **Our problems are complex and truly multidisciplinary**
- **Technical excellence & technical truth**
  - Scientific Method
  - Peer/independent review
  - Full and open competition
- **We are always looking for outstanding PMs**
- **How to find out more about IARPA**:

  www.IARPA.gov
- **Contact Information**

  Phone: 301-851-7500



OFFICE OF THE DIRECTOR OF NATIONAL INTELLIGENCE

Quantum Enhanced Optimization (QEO) Program Overview

Karl F. Roenigk, PhD
Program Manager
Office of Safe and Secure Operations

26 October 2015

Presentation Outline

1. IARPA outlook on novel qubits, hardware, and approaches to quantum annealing
2. From CSQ to QEO
3. QEO BAA: Structure and Goals

1. IARPA Outlook: Quantum Annealing

- **Coherence *is* plausibly important for enhanced performance across a range of problems**
- Speed-up is *not* the only goal; i.e., quantum-enhanced sampling of state space of equally useful solutions. QEO will establish a broader definition of "*enhancement.*"
- What quantum annealing offers to hard problems of interest today remains unanswered, and is not apparently answerable by the trajectory of current technology
- IARPA advanced coherence of superconducting qubits in its 5-year CSQ Program
  - the *flux* qubit remains the preferred basis for future development of quantum annealing
- In 2014 IARPA began a study – ***Quantum Enhanced Optimization (QEO)*** – of extending CSQ qubit technology to near-term advances in quantum *annealing, and assessing plausibility for enhancement from of a wide range of proposed innovations from MIT LL and NASA*
- *In 2015 IARPA initiated a quantum annealing Test Bed capability at MIT LL, for V&V of innovative concepts supporting a basis for design of application-scale annealers*

1. IARPA Outlook: Quantum Annealing

IARPA will explore unanswered questions with the scientific community …

- Are CSQ qubits – possessing limited temporal fidelity and coherence – adequate for the less demanding application to quantum annealing?
- How should qubits be changed to make them useful and optimal in quantum annealing?
- What are effects of qubit variability on performance of quantum annealing?
- Can we succeed with quantum annealing for problems of interest?
- What are the most significant problems accessible to quantum annealing of interest?
- How much improvement is *theoretically* possible over machines available today, and, actually *achievable*?
- Within the space of optimization problems, which subtypes are of interest and why?
  - In terms of classical complexity, where do these problems fit?
  - What approaches are currently in use for solving these problems?
  - What is the performance of current approaches?
  - To what degree must classical and heuristic methods be advanced to quantify quantum enhancement?
- Which quantum phenomena are important to achieve better-than-classical performance?
- How do we now optimally explore the new "quantum" heuristics available in quantum annealing? How do we best combine QA & classical resources for optimal implementation?

1. IARPA Outlook: Hardware Requirements

To succeed in solution of hard problems, single Ising spins in the architecture require:

- Both Z and X fields tunable
  - Access to zero Z field (with two qubit levels degenerate, enables mapping of harder problems)
  - X-field induced quantum fluctuations (enables tunable tunneling)
- Large anharmonicity (enables higher fidelity mappings, initialization, and continuation)
- Two-spin coupling to include:
  - Ising (ZZ) coupling at zero local offset field (enables harder problems, and begs for flux qubit)
  - Non-stoquastic coupling (e.g., XX): the only known quantum annealing interaction for which there is no known equivalent means to simulate via a classical, polynomial-time algorithm; thus, a highly promising interaction to explore for enhancement
  - Multiple, intrinsic connections per qubit (enables efficient programming and more complex solutions)
  - Short and long-range coupling (expands programming reach with fewer resources)
- Reproducible fabrication and performance (avoids drop-outs with loss of functionality & programmability)
- Scalable connectivity to large systems, with minimal ancillary overhead resources

2. Baseline Capability: Building from CSQ to QEO

Reproducible at Start (μs)			Current Best (μs)		Current Best Repeated In-Run (μs)*		Current …	
Qubit Type Team	T_1	T_2 / T_{2Echo}	T_1	T_2 / T_{2Echo}	T_1	T_2 / T_{2Echo}	Typical Run-to-Run Range in T_1	Readout Fidelity
Phase UCSB / UWI	0.3	0.1	1.6	0.2	1.4	0.2	0.8-1.4	95%
Transmon Yale	2	2 / 2	13	/ 8	8 – 10	/ 6-8	8-10	TBD
3D vertical	N/A	N/A	45	/ 25	20	/ 10	15-25	TBD
3D transmon	N/A	N/A	~ 100	/ 150	~ 100	/ 100-150	~ 100	TBD
2D fluxonium	N/A	N/A	10	/ 10	8	/ 8	8-10	TBD
3D fluxonium	N/A	N/A	8000	15 / 50	1000	14-15 / 20-50	1000-8000	TBD
MIT LL 2D	2	2 / 2	35	21 / 24	30	20 / 20	25 ± 10	TBD
MIT LL 3D	N/A	N/A	80	115 / 154	80	115 / 154	70-100	TBD
Xmon UCSB	N/A	N/A	58	15 / 25	35	TBD	20-60	99.6 %
Flux UCB - UIUC	2	0.5 / 1-2	8	2.5 / 3	5	2 / 2	1-5	94%
Flux C-shunt MITLL/UCB/MIT	**N/A**	**N/A**	**55**	**30/43**	**45-50**	**25/40**	**>40**	**>95%**

* In-Run implies qubit-to-qubit within a processing run; run-to-run implies variability in qubits from separate processing runs

2. Baseline Capability: From CSQ to QEO

Reproducible at Start (μs)			Current Best (μs)		Current Best Repeated In-Run (μs)*		Current …	
Qubit Type Team	T_1	T_2 / T_{2Echo}	T_1	T_2 / T_{2Echo}	T_1	T_2 / T_{2Echo}	Typical Run-to-Run Range in T_1	Readout Fidelity
Flux UCB - UIUC	2	0.5 / 1-2	8	2.5 / 3	5	2 / 2	1-5	94%
Flux C-shunt MITLL/UCB/MIT	**N/A**	**N/A**	**55**	**30/43**	**45-50**	**25/40**	**>40**	**>95%**

- Reproducibility from feature and process variability remains clouded by noise
  - ➢ Noise, temporal variability and coherence are correlated and influenced by coupling to stochastic, temporal defects (from materials, designs, IO …)
  - ➢ Magnetic field, vortex, and quasiparticle effects have only begun to be studied
- Advances in T_2 have *largely* followed purposeful advances in T_1
  - ➢ 1/f noise sources remain a mystery, and uncontrolled
  - ➢ Temporal and on/off T_1-switching dynamics are here now
- ***For quantum annealing, optimal T_1 / T_2 coherence is unknown, and TBD***

* In-Run implies qubit-to-qubit within a processing run; run-to-run implies variability in qubits from separate processing runs

2. From CSQ to QEO

- Reproducible, low-noise, highly-connected, and high-coherence flux qubit circuits offer a promising hardware platform to harness quantum fluctuations that enhance quantum annealing
  - ➢ CSQ provides a strong basis, but *the work of CSQ is unfinished*
    - ○ T_1 & T_2 are temporal over vast timescales relevant to quantum annealing
    - ○ Sources of noise remain unknown, and uncontrolled
    - ○ Significant additional advances in the MIT LL flux qubit are imminent
    - ○ The character of noise continues to change with advances; on/off is here now
    - ○ IARPA will explore unique demands on future flux qubits for annealing

- Quantum Annealing is challenged with an expansive, uncharted parameter space
  - ➢ "Optimal" for QA is unknown (i.e., coherence, designs, architecture, programming, operation…), and highly complex; even for single qubits
  - ➢ Removing *and circumnavigating* noise sources – by design, programming and adaptive annealing – presents a significant challenge, and opportunity

3. The Quantum Enhanced Optimization (QEO) BAA

QEO BAA Summary –

QEO seeks to harness quantum effects required to enhance quantum annealing solutions to hard combinatorial optimization problems.

The physics underlying quantum enhancement will be corroborated by design and demonstration of research-scale annealing test beds; comprised of novel superconducting qubits, architectures, and operating procedures.

All work will serve to demonstrate a plausible path to enhancement and a basis for design of application-scale quantum annealers.

3. QEO BAA

QEO developments are focused around applications areas

Classical annealing methods are employed in the following combinatorial optimization problem areas of interest:

Resource allocation, including tasking and scheduling of autonomous vehicles and other assets (e.g., the travelling salesman problem, job-shop scheduling, machine-tasking, circuit layout), electronic and transportation network traffic management, supply chain optimization, and highly-parallel computing;

Analysis of extremely large datasets, including image processing, facial and pattern recognition, network and anomaly detection; and,

Constraint satisfaction problems, such as scheduling, SAT filter design (e.g., k-SAT), and design optimization of communication and transportation networks.

3. QEO BAA

Within the above areas, QEO seeks discovery of optimal embodiments for the following specific applications problems:

1. Fault diagnostics, and specifically problems related to a 16x16 multiplier CRC, i.e. circuit C6288, described in detail at http://web.eecs.umich.edu/~jhayes/iscas.restore/c6288.html;

2. k-SAT, and at minimum 3-SAT, for problems including search filter design, and other significant problems where k-SAT offers compelling performance; and

3. Machine-task / job-shop type scheduling, and or circuit layout.

3. QEO BAA

The QEO program is divided into two phases. Phase 1 will run for a period of 36 months, followed by Phase 2 at 24 months.

Proposals are sought to develop theoretical and experimental capability to design, fabricate, analyze, and optimize quantum annealing Test Beds.

QEO performers will corroborate innovative concepts and predictive models of enhancement through Test Bed experiments; demonstrating how enhancement is optimally promoted by design and operation, and estimating the elements of design for application-scale machines.

3. QEO BAA

From all developments, the goal of the QEO Program is to provide *a physical basis of design for application-scale quantum annealers providing a 10^4 speed-up with polynomial improvement in scaling complexity over classical methods.*

3. QEO BAA: Basis of Design Elements

QEO seeks a basis of design for application-scale quantum annealers, including but not limited to specification of the following elements:

- programming including optimized error mitigation, and associated hardware and implementation;
- number of physical spin qubits;
- detailed designs for physical spin qubits, spin qubit coupling primitives, architectural primitives, and architectures;
- connectivity and topology;
- designs, metrics, and tolerances for readout and all electronics and integration (e.g., control bandwidth, resolution, accuracy, classical processing requirements for signal generation, conditioning, feedback, long-term amplitude stability, and measurement bandwidth per spin);
- fabrication processes for all integrated elements of the annealer assembly and constructions; and
- annealer operating parameters and methods (e.g., classical pre- and post-processing requirements, embedding, error mitigation, intelligent annealing strategy and measurements for adaptive feedback).

3. QEO BAA: Capability of Interest

To meet the program goal, QEO will explore a wide range of highly advanced quantum annealing capabilities, including:

- Physical-Spin-Qubits with high, tunable coherence and function;
- Advanced quantum fluctuations (*e.g.,* multi-spin);
- Broader classes of spin connectivity and physical architectures to access a broader, harder, problem space (*e.g., simultaneous* long-range and multi-spin interactions, higher intrinsic connectivity);
- Real-time measurements during the annealing protocol to elucidate quantum enhancement phenomena and optimize both design and dynamic operation for performance;
- Advanced annealing protocols (*e.g.,* spatially-varying fields and couplings, adaptive control methods based on feedback, active qubit cooling);
- Quantum error mitigation: error suppression, as well as engineered dissipation and cooling;
- Greater precision, stability, and speed of calibration and control signals using state-of-art electronics;
- Smart integration that optimizes the separate quantum (coherent Ising spins and couplings) and classical (control and readout) elements of the annealing system

3. QEO BAA: Capability of Interest

Through experimental Test Beds, QEO seeks optimal implementations of advanced capabilities to meet the program goal.

The following Table describes a range of advanced capabilities of interest in the QEO Program. Additional capabilities may be proposed when defended for their potential.

Combinations of capabilities of interest possess plausibility to strengthen quantum effects and speed annealing spin-flip dynamics by many orders of magnitude.

QEO seeks to harness these order of magnitude improvements to enhance solution outcomes.

3. QEO BAA: Capability of Interest

Design Space	Current Technology	QEO Capability of Interest
Spin-Qubit Coherence	~ <10 ns	**T_1 > 20 µs; and T_2 > 10 µs over all local field settings; fully integrated X & Z tunable, independent and or correlation-compensated X and Z field tuning**
Multi-spin Entanglement	Evident for large gap systems	**Maximally extended, "n"-spin coherence and entanglement in small gap systems**
System Size	1152 spins, envisioning doublings	**≥ 100 qubits**
Classical Hamiltonian coefficient precision / dynamic range	percent-level	**≥10 bits of dynamic range**
Physical Ising Connectivity	six 2-spin Ising (ZZ) connections per physical spin	**>20 two-spin Ising couplings (ZZ) per physical spin; Higher-rank Ising couplings of ≥4 spins (i.e. ZZZZ)**

3. QEO BAA: Capability of Interest

Design Space	Current Technology	QEO Capability of Interest
Types of driver Hamiltonians (quantum spin fluctuations)	Single-spin transverse field (independent fluctuations of each spin)	**Multi-spin fluctuations including non-stoquastic terms (e.g., +XX); Higher-rank fluctuations involving ≥4 spins (i.e. XXXX)**
Error Mitigation	Classical error suppression via embedding	**Quantum error mitigation; error suppression via architecture and embedding, and mitigation by engineered dissipation and cooling employing sympathetic circuits and protocol**
Spin measurement	Projective measurement of each spin at the end of annealing run, using dissipative (voltage-state) readout	**Continuous (real-time) , near-quantum-limited, dissipationless spin measurement with strength adjustable from weak to projective; tailored spin ensemble measurements including entanglement witnesses**
Annealing schedule	Single-parameter annealing schedule (i.e., uniform transverse field) with limited bandwidth (minimum annealing time 20 μs)	**Independent, wideband control of each spin and coupling (spatiotemporal variation of local fields and couplings); active feedback to annealing parameters based on run-to-run and in-run (real-time) system measurement**

3. QEO BAA: Government T&E

Government Test and Evaluation (T&E) teams will reproduce (validate) significant performer results, and validate all projections and experimental corroborations of enhancement.

A *Government-Furnished* software framework and database (GFD) will facilitate systematic developments; including data handling, evaluation, sharing across teams for large scale simulations, and benchmarking of methods and problems.

GFD to include state-of-art, optimized codes for SA & SQA, unitary time evolution, and open quantum systems simulations.

*GFD *developed from contributions by :*
M. Troyer et. al. at ETH Zurich,
H. Katzgraber et. al. at Texas A&M University, and
E. Rieffel et. al. at NASA.

3. QEO BAA: Test Bed Challenges

QEO seeks theoretical and experimental developments to address critical *Challenges* to the program goal:

- Scalable enhancement
- Intelligent annealing
- Scalable quantum error mitigation
- Application-specific architectures

3. QEO BAA: Milestones and Metrics

The Government will employ minimum required Program Milestones and Metrics described in Tables below to evaluate the effectiveness of proposed solutions in achieving the stated program objectives, and to determine whether satisfactory progress is being made to warrant continued funding of the program.

Progressive metrics in include *projected* (predicted) and *corroborated* measures of enhancement in solution outcomes to an Ising problem. Enhancement is to be *projected* to the problem size regime expected to exhibit asymptotic scaling complexity, and in QEO this regime is assumed for $n > 10^5$. Meeting *projected* enhancement metrics requires that teams demonstrate, through physics-based models and simulations, *corroborated* by Test Bed experiments, how the metric relies on the proposed, optimal combination of innovative capabilities.

Offerors may specify additional metrics for enhancement, including but not limited to residual energy, spin-flip dynamics, quantum fluctuation strength, and statistical quality of degenerate solutions (e.g., Hamming distance disparateness of k-SAT filter solutions) and or related k-SAT filter efficiency.

NOTE:
Test Bed systems metrics are required by Month 3 within Years 3-5
Enhancement metrics are required by Month 9 within Years 3-5

3. QEO BAA: Milestones and Metrics (minimum)

Months after Start	Milestone Description	Metrics
Phase 1		
9	Methods & Indicators	• > 10^1 speed-up projected
21	Benchmarks	• > 10^2 speed-up projected
33	Diagnostic Prototype	• > 10^2 speed-up corroborated in DP • > 10^3 speed-up projected • Polynomial $n^{1/2}$ improvement in scaling complexity projected
Phase 2		
45	Test Bed 1	• > 10^3 speed-up corroborated in TB1 • > 10^4 speed-up projected
57	Test Bed 2	• > 10^4 speed-up corroborated in TB2
60	Application-Scale	• Polynomial n^1 improvement in scaling complexity projected • Final basis of design for application-scale

3. QEO BAA: Milestones and Metrics (minimum)
Test Bed Systems, and Enhancement

Year→	1	2	3	4	5
Month → Test Bed→ ↓ Design Space	……..9…	……..21…	…27……. Diagnostic Prototype	..39……. Test Bed 1	..51……. Test Bed 2
Coherence time T_1 μs	10	10	10	20	20
Coherence time T_2 μs On / Off	10 / 1	10 / 2	20 / 5	20 / 5	20 / 10
Physical Spin Qubits	≥ 2	≥ 8	≥ 16	≥ 48	≥ 100
Coupled Architectural Primitives			≥ 2	≥ 3	≥ 4
Precision, bits	≥ 7	≥ 7	≥ 7	≥ 8	≥ 10
Physical two-spin Ising Connectivity per Physical Spin Qubit	≥ 2	≥ 8	≥ 10	≥ 16	≥ 20
Driver Hamiltonian spin fluctuations	≥ 2: ±XX	≥ 2: ±XX	≥ 3	≥ 4	≥ 4
Month → ↓ Enhancement over classical	……..9…	……..21…	……..33…	……..45…	………..60
Speed-up *projected* Speed-up model *corroborated* Polynomial scaling improvement (modeled at Application-Scale)	10^1	10^2	10^3 10^2 $> n^{1/2}$	10^4 10^3	10^4 10^4 $> n^1$

Eligibility Information

- Collaborative efforts are strongly encouraged
  - Content, communications, networking and team formation is the responsibility of proposers.
- Foreign organizations and/or individuals are welcome to participate
  - Must comply with Non-Disclosure Agreements, Security Regulations, Export Control Laws, etc., as appropriate.

- Other Government Agencies, Federally Funded Research and Development Centers (FFRDCs), University Affiliated Research Centers (UARCs), and any organizations that have a special relationship with the Government, including access to privileged and/or proprietary information, or access to Government equipment or real property, are not eligible to submit proposals under this BAA or participate as team members under proposals submitted by eligible entities.
- ***Please immediately notify the QEO Program Manager*** if teams wish to utilize any resources from above organizations: If IARPA determines the resources are *unique and do not exist in the private sector*, IARPA will *attempt* to work directly with organizations to arrange for capability to be made available to all program participants who might benefit.

Evaluation Criteria

- Evaluation criteria in descending order of importance are:
  - Overall scientific and technical merit
  - Effectiveness of proposed work plan
  - Relevance to IARPA mission and QEO program goals
  - Relevant experience and expertise of the members of the team
  - Cost realism
- All responsive proposals will be evaluated by a board of qualified government reviewers

Point of Contact

Dr. Karl F. Roenigk

Program Manager

IARPA, Safe and Secure Operations Office

Office of the Director of National Intelligence

Intelligence Advanced Research Projects Activity

Washington, DC 20511

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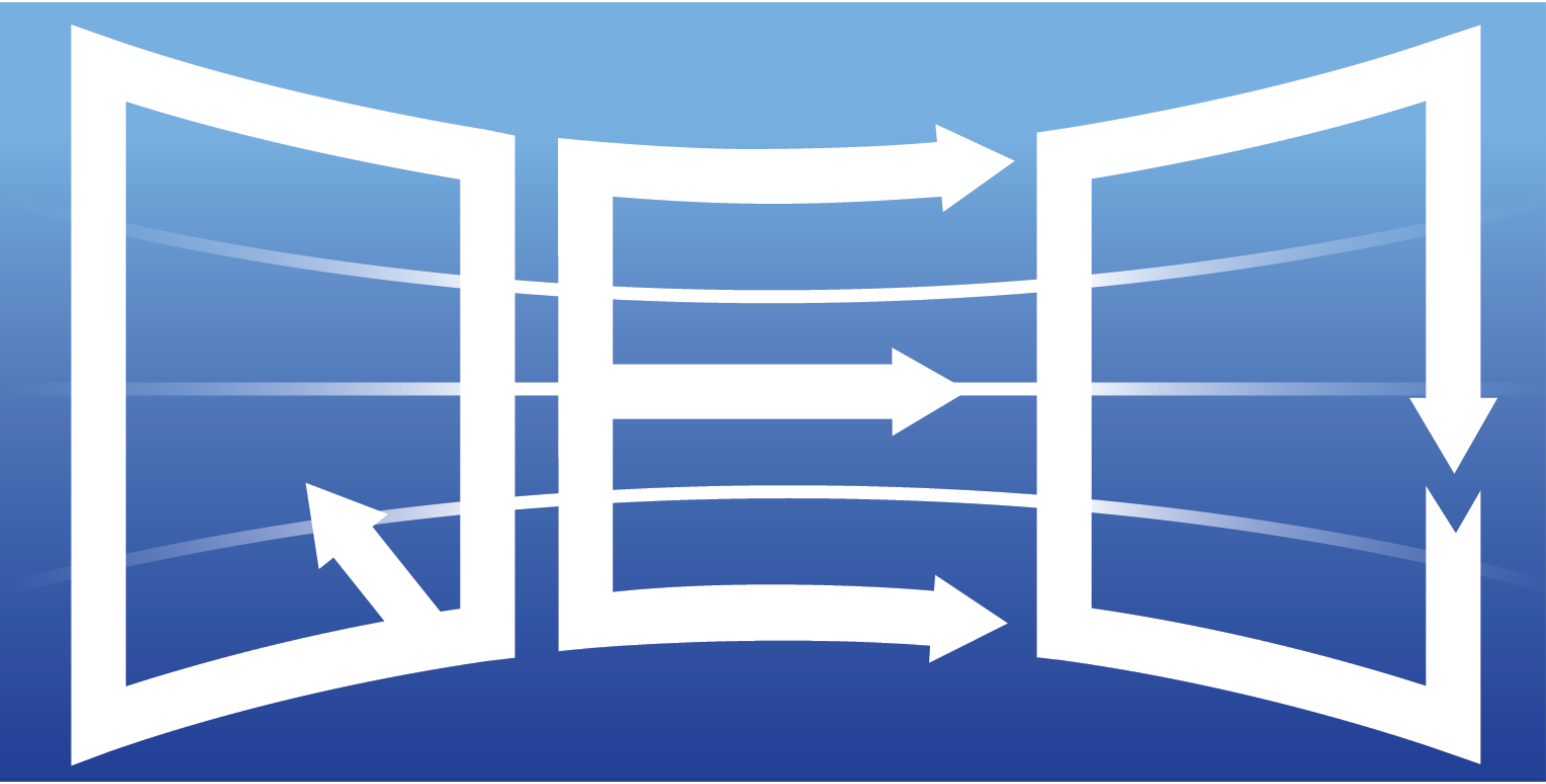
Fax: (301) 851-7673

Electronic mail: dni-iarpa-baa-15-13@iarpa.gov

(include IARPA-BAA-15-13 in the Subject Line)

Website: www.iarpa.gov

Questions? Please fill out index cards.



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Doing Business with IARPA

Mr. Tarek Abboushi

Doing Business with IARPA - Recurring Questions

- Questions and Answers (http://www.iarpa.gov/index.php/faqs)
- Eligibility Info
- Intellectual Property
- Pre-Publication Review
- Preparing the Proposal (Broad Agency Announcement (BAA) Section 4)
  - Electronic Proposal Delivery (https://iarpa-ideas.gov)
- Organizational Conflicts of Interest

  (http://www.iarpa.gov/index.php/working-with-iarpa/iarpas-approach-to-oci)
- Streamlining the Award Process
  - Accounting system
  - Key Personnel
- IARPA Funds Applied Research
- RECOMMENDATION: Read the entire BAA

Responding to Q&As

- Please read entire BAA before submitting questions
- Pay attention to Section 4 (Application & Submission Info)
- Read Frequently Asked Questions on the IARPA @

  http://www.iarpa.gov/index.php/faqs
- Send your questions as soon as possible
  - QEO BAA: **dni-iarpa-baa-15-13@iarpa.gov**
  - Write questions as clearly as possible
  - Do NOT include proprietary information

Eligible Applicants

- Collaborative efforts/teaming strongly encouraged
  - Content, communications, networking, and team formation are the responsibility of Proposers
- Foreign organizations and/or individuals may participate
  - Must comply with Non-Disclosure Agreements, Security Regulations, Export Control Laws, etc., as appropriate, as identified in the BAA

Ineligible Organizations

Other Government Agencies, Federally Funded Research and Development Centers (FFRDCs), University Affiliated Research Centers (UARCs), and any organizations that have a special relationship with the Government, including access to privileged and/or proprietary information, or access to Government equipment or real property, are not eligible to submit proposals under this BAA or participate as team members under proposals submitted by eligible entities.

Intellectual Property (IP)

- Unless otherwise requested, Government rights for data first produced under IARPA contracts will be UNLIMITED
- At a minimum, IARPA requires Government Purpose Rights (GPR) for data developed with mixed funding
- Exceptions to GPR
  - State in the proposal any restrictions on deliverables relating to existing materials (data, software, tools, etc.)
- If selected for negotiations, you must provide the terms relating to any restricted data or software, to the Contracting Officer

Pre-Publication Review

- Funded Applied Research efforts, IARPA encourages:
  - Publication for Peer Review of **<u>UNCLASSIFIED</u>** research

- Prior to public release of any work submitted for publication, the Performer will:
  - Provide courtesy copies to the IARPA PM and Contracting Officer Representative (COR/COTR)
  - Ensure shared understanding of applied research implications between IARPA and Performers

Preparing the Proposal

- Note restrictions in BAA Section 4 on proposal submissions
  - Interested Offerors must register electronically IAW instructions on: **https://iarpa-ideas.gov**
  - Interested Offerors are strongly encouraged to register in IDEAS at least 1 week prior to proposal “Due Date”
  - Offerors must ensure the version submitted to IDEAS is the “Final Version”
  - Classified proposals – Contact IARPA Chief of Security
- BAA format is established to answer most questions
- Check FBO for amendments & IARPA website for Q&As
- BAA Section 5 – Read Evaluation Criteria carefully
  - e.g. “The technical approach is credible and includes a clear assessment of primary risks and a means to address them”

Preparing the Proposal (BAA Sect 4)

- Read IARPA's Organizational Conflict of Interest (OCI) policy: **http://www.iarpa.gov/index.php/working-with-iarpa/iarpas-approach-to-oci**
- See also eligibility restrictions on use of Federally Funded Research and Development Centers, University Affiliated Research Centers, and other similar organizations that have a special relationship with the Government
  - Focus on possible OCIs of your institution as well as the personnel on your team
  - See Section 4: It specifies the non-Government (e.g., SETA, FFRDC, UARC, etc.) support we will be using. If you have a potential or *perceived* conflict, request a waiver as soon as possible

Organizational Conflict of Interest (OCI)

- If a prospective offeror, or any of its proposed subcontractor teammates, believes that a potential conflict of interest exists or may exist (whether organizational or otherwise), the offeror should promptly raise the issue with IARPA and submit a waiver request by e-mail to the mailbox address for this BAA at **dni-iarpa-baa-15-13@iarpa.gov**.
- A potential conflict of interest includes but is not limited to any instance where an offeror, or any of its proposed subcontractor teammates, is providing either scientific, engineering and technical assistance (SETA) or technical consultation to IARPA. In all cases, the offeror shall identify the contract under which the SETA or consultant support is being provided.
- Without a waiver from the IARPA Director, neither an offeror, nor its proposed subcontractor teammates, can simultaneously provide SETA support or technical consultation to IARPA and compete or perform as a Performer under this solicitation.

Streamlining the Award Process

- Cost Proposal – we only need what we ask for in BAA
- Approved accounting system needed for Cost Reimbursable contracts
  - Must be able to accumulate costs on job-order basis
  - DCAA (or cognizant auditor) must approve system
  - See **http://www.dcaa.mil** , “Audit Process Overview - Information for Contractors” under the “Guidance” tab
- Statements of Work (format) may need to be revised
- Key Personnel
  - Expectations of time, note the Evaluation Criteria requiring relevant experience and expertise
- Following selection, Contracting Officer may request your review of subcontractor proposals

IARPA Funding

- IARPA funds <u>Applied Research</u> for the Intelligence Community (IC)
  - IARPA cannot waive the requirements of Export Administrative Regulation (EAR) or International Traffic in Arms Regulation (ITAR)
  - Not subject to DoD funding restrictions for R&D related to overhead rates

- IARPA is <u>not</u> DOD

Disclaimer

- This is Applied Research for the Intelligence Community
- Content of the Final BAA will be specific to this program
  - The Final BAA is being developed
  - Following issuance, look for Amendments and Q&As
  - There will likely be changes
- The information conveyed in this brief and discussion is for planning purposes and is subject to change prior to the release of the Final BAA.

Point of Contact

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(include IARPA-BAA-15-13 in the Subject Line)

Website: www.iarpa.gov

Questions? Please fill out index cards.